Small Business Innovation Research/Small Business Tech Transfer

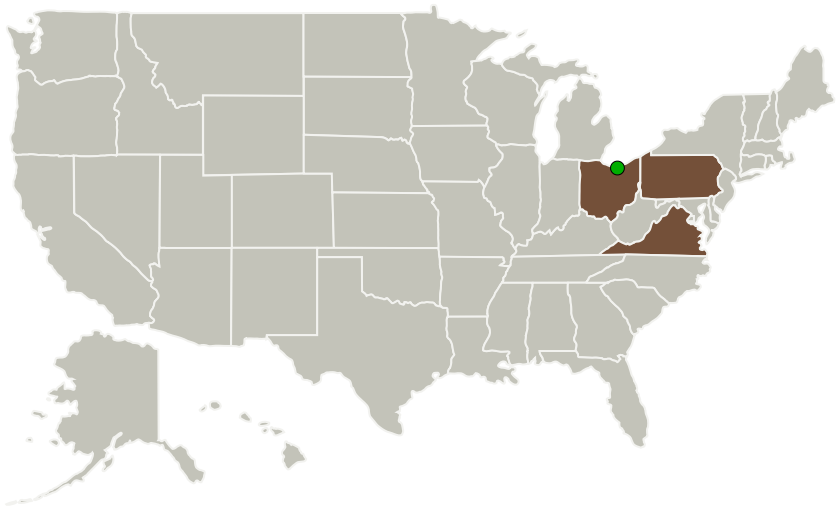
Advanced Deposition Capability for Oxidation & Corrosion Protection Coatings, Phase I

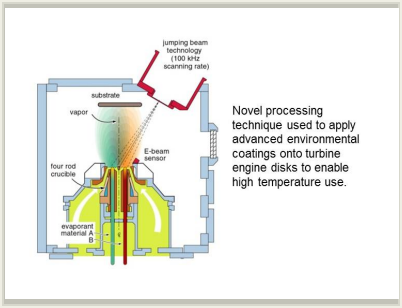
Completed Technology Project (2013 - 2014)

Project Introduction

NASA's long range goals of reducing the fuel consumption by 30% and increasing fuel efficiency by 35% can be partially accomplished through increasing engine operation temperatures. As a result, the disk section is desired to operate in increasingly higher temperatures, which will subject it to additional degradation mechanisms of oxidation and hot corrosion. One approach to enhance the temperature capability of these systems is through the incorporation of environmental protective coatings which can provide resistance from oxidation and hot corrosion. Research is proposed here to optimize the use of advanced coating manufacturing techniques designed to enable the affordable application of environmental protective coatings having enhanced resistance to hot corrosion and oxidation to allow operation at the desired high temperature engine environments. Advanced testing conditions will be used to simulate real world conditions and demonstrate the performance of the deposited coatings in these conditions. This approach is envisioned to aid the development of advanced coatings required to protect the surface of turbine disk components at higher temperatures desired for fuel and thrust operationally improvement without inducing significant fatigue debit. Advanced coating systems will be applied in this work onto coupons, and subcomponents to demonstrate coating capability and allow simulated engine environment testing in follow on programs. Success in meeting the objectives will significantly aid the temperature capability of turbine disk components, allowing significant fuel efficiency and thrust increases for turbine engines.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Directed Vapor Technologies International, Inc	Lead Organization	Industry	Charlottesville, Virginia
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio
University of Pittsburgh-Pittsburgh Campus	Supporting Organization	Academia	Pittsburgh, Pennsylvania

Primary U.S. Work Locations	
Ohio	Pennsylvania
Virginia	

Project Transitions

May 2013: Project Start

May 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140473)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Directed Vapor Technologies International, Inc

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

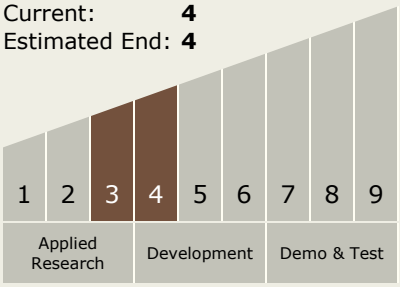
Carlos Torrez

Principal Investigator:

Susie Eustis

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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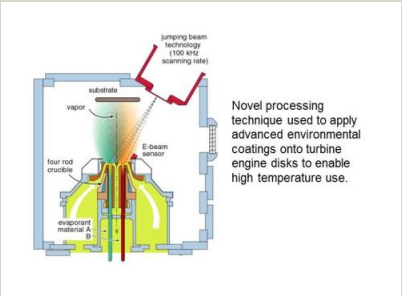
Images



Project Image
Advanced Deposition Capability for Oxidation & Corrosion Protection Coatings
(https://techport.nasa.gov/image/136045)

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.5 Coatings

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System